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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/507,605	02/21/2000	Wen-Ching Yang	RDM98002	1861

26353 7590 09/05/2003

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EXAMINER

LEUNG, JENNIFER A

ART UNIT PAPER NUMBER

1764

DATE MAILED: 09/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/507,605

Applicant(s)

YANG ET AL.

Examiner

Jennifer A. Leung

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-6,8-10 and 12-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8-10 and 12-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment submitted on June 19, 2003 has been received and carefully considered. Claim 21 has been added. Claims 3, 7 and 11 are cancelled. Claims 1, 2, 4-6, 8-10 and 12-21 remain active.

### ***Allowable Subject Matter***

2. Claim 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims, since the prior art of record does not disclose or adequately teach control valves for individually controlling the quantity of gas passing through the respective plurality of peripheral gas inlet jets, and the prior art is further silent as to the apparatus being in fluid communication with a fluidizing chlorine gas supply.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 2, 4-6, 8-10 and 12-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, "the raw materials" (lines 6, 7 and 15-16) and "the reactant materials" (line 33) lack proper positive antecedent basis. Additionally, it is unclear as to the relationship between "solids" (lines 8, 10) and the recited raw materials, reactant materials, and zirconium and rutile sands. Also, the phrase, "good mixing" (line 32) is considered vague and indefinite,

since "good" is a relative term.

Regarding claim 8, the language of the claim is drawn to a method limitation which renders the claim vague and indefinite, as it is unclear as to the structural limitation applicants are attempting to recite by, "the sparger gas is introduced at a downwardly directed angle..." since "the sparger gas" is not considered an element of the apparatus (i.e., proper structural language would recite, "the sparger chlorine gas orifices are directed at a downward angle...").

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 8, 9, 14, 15 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Uemura et al. (U.S. 4,308,806).

Regarding claim 1, Uemura et al. (FIG. 1, 2, 3; column 4, lines 14-53) discloses a fluidized bed reactor comprising:

- a hollow, elongated, vertically oriented reactor housing **12** defining a reaction zone **34**;
- a central gas inlet **19** proximate the bottom of the reaction zone **34** within the housing for directing gas in an upward direction along the vertical axis of the housing into the reaction zone **34** without passing through a solid or perforated diffuser section;
- a plurality of peripheral gas inlet jets **16** positioned at at least two elevations along the elongated dimension of the housing for introducing gas at an angle to the dimension;
- a residue collection housing (defined by pipe **24**) mating at one end with a lower portion

of the reactor housing and having an inclined lower wall (defined by pipe **25**) for directing residue from the reaction zone to a residue collection port; and

- a sparger including a plurality of gas orifices (i.e., pressurized air chamber **26** and orifices/nozzles **27**) positioned around at least a portion of the circumference of the interior of residue collection housing **24** and below the central gas inlet **19**;

wherein the sparger gas orifices **27**, the plurality of peripheral gas inlet jets **16** and the central gas inlet **19** are inherently sized so that the volume of gas emitted by each is a fixed predetermined ratio, since every orifice, jet or inlet inherently defines an opening of a given size, and the ratio between any two given sizes inherently defines a predetermined ratio. Although a central *chlorine* gas inlet, a plurality of peripheral *chlorine* gas inlet jets and a plurality of *chlorine* gas orifices are not disclosed, the apparatus of Uemura et al. still meets the claim since the recitation of “chlorine” provides no further structural limitation and is merely a recitation of the intended use of the reactor elements, which holds no patentable weight in apparatus claims.

Regarding claim 2, Uemura et al. (FIG. 2; column 4, lines 19-25, 29-36) disclose the reactor housing has a conical section **14** circumscribing the reaction zone with the reduced diameter of the conical section at its lower end interfacing with the gas inlet **19**.

Regarding claim 8, Uemura et al. disclose the sparger gas is introduced at a downwardly directed angle to the central axis of the housing (i.e. downwardly sloping nozzles **27**; FIG. 2).

Regarding claim 9, the incline of the lower wall (defined by pipe **25**) of the residue collection housing (defined by pipe **24**) in the apparatus of Uemura et al. is inherently designed such that the gravitational forces on the residue above the given size overcome the wall friction, in order to enable the travel of residue to the collection port (FIG. 2).

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Regarding claim 14, Uemura et al. (FIG. 2, 3; column 4, lines 25-27) disclose the plurality of peripheral gas inlet jets 16 includes a plurality of gas jets at each of said elevations respectively positioned around the circumference of the reactor housing.

Regarding claim 15, Uemura et al. (FIG. 2, 3; column 4, lines 25-27) disclose by illustration the plurality of peripheral gas inlet jets 16 at each elevation are equidistantly positioned around the circumference of the reactor housing.

Regarding claim 18, Uemura et al. (FIG. 2, Abstract) further disclose the plurality of peripheral gas inlet jets 16 are positioned at at least three elevations.

Instant claims 1, 2, 8, 9, 14, 15 and 18 structurally read on the apparatus of Uemura et al.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 4-6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (U.S. 4,308,806) in view of Bogner et al. (EP 0 150 091).

Regarding claims 4 and 5, Uemura et al. disclose by illustration a valve means (FIG. 2) positioned at the residue collection port for controlling discharge of residue from collection housing 24, but are silent as to whether the residue may be discharged using a feeder, such as a screw or rotary feeder, positioned at the port. In any event, it would have been obvious for one

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of ordinary skill in the art at the time the invention was made to substitute a feeder for the valve means in the apparatus of Uemura et al., on the basis of suitability for the intended use, since the use of feeders for controlling the discharge of residue from a reactor is well known in the art, as evidenced by Bogner et al. In particular, Bogner et al. teach a rotary or star-wheel feeder **21, 121** positioned at the residue collection port **20, 120** of fluidized bed reactor **10, 110** for removing residue from the collection housing (defining ash annulus **14, 114**). Provision of the feeder allows the level of residue within the annulus of collection housing to be controlled (page 6, lines 8-16; page 7, line 21-page 8, line 20; page 9, lines 13-15; FIG. 1, 2). Also, substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Regarding claims 6 and 17, Bogner et al. (page 8, lines 1-11) teach the feeder may operate under steady-state operation or, during periods of turn-up or turn-down, the withdrawal rate of the feeder may be increased or decreased. Inherently, the feeder would be capable of operating in either a "continuous mode" or "batch mode" based on adjustments made to the withdrawal rate. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate operating mode for the feeder in the modified apparatus of Uemura et al. on the basis of suitability for the intended use (i.e. for establishing a given residue level within the collection housing). In any event, it has been held that it is within the level of ordinary skill to operate a process continuously, and likewise, to convert a process from continuous to batch. *In re Dilnot* 138 USPQ 248 (CCPA 1963); *In re Korpi* 73 USPQ 229 (CCPA 1947); *In re Lincoln* 53 USPQ 40 (CCPA 1942).



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6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (U.S. 4,308,806) in view of Haldipur (U.S. 4,569,681).

Uemura et al. disclose peripheral gas inlet jets **16**, "give[s] intensive fluidized swirls to a fluidized heat transfer medium **32** contained in the body **12**," (column 4, lines 19-25), but are silent as to jets **16** being directed at a downward angle to a line perpendicular to the central axis of housing **12**. Haldipur (FIG. 3, 4, 5; column 4, lines 3-15) teaches a gasifier comprising peripheral gas inlet jets **38** provided at a downward angle to a line perpendicular to the central axis of housing **12**. It would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select a downward angle for the peripheral gas inlet jets in the apparatus of Uemura et al. since such a configuration enables the gas, and hence the reaction particulates, to be directed towards the top of nozzle **14** (i.e., central gas inlet pipe **19** of Uemura), and further causes a sweeping action of the transition section **26** (i.e., conical zone **14** of Uemura), as taught by Haldipur.

7. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (U.S. 4,308,806).

Regarding claim 12, Uemura et al. are silent as to sizing the openings of the central gas inlet **19**, the peripheral gas inlet jets **16** and sparger orifices **27** such that the respective openings are structurally formed to feed the recited percentages of fluidizing gas. In any event, the specific percentages of fluidizing gas are not considered to confer patentability to the claim since the precise percentage would have been considered a result effective variable by one having ordinary skill in the art. Also, it is noted that the present specification sets forth on page 3, lines 1-7, that the claimed ratio is, at best, a preferred limitation. As such, without more, the claimed

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ratio cannot be considered "critical". Accordingly, one having ordinary skill in the art would have routinely optimized the amount of fluidizing gas in the system by adjusting the sizing of the inlets/jets/orifices to obtain the desired fluidization behavior, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 16, although Uemura et al. are silent as to staggered positioning of the inlet jets 16, it would have been an obvious design choice for one of ordinary skill in the art to select such a positioning in the apparatus of Uemura et al. in order to achieve a desired fluidizing behavior (i.e., intensive fluidized swirls; column 4, lines 19-25), since shifting location of parts was held to have been obvious, *In re Japikse*, 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (U.S. 4,308,806) in view of Worley et al. (U.S. 4,198,210).

Regarding claims 19 and 20, Uemura et al. disclose pressurized air is supplied to the inlet jets 16 and sparger orifices 27, and thus, the jets and orifices are inherently structurally formed to define a given pressure drop across the reaction zone for a given volume of the pressurized air. However, Uemura et al. are silent as to jets 16 and orifices 27 being structurally formed to give a pressure drop of at least 30% across the reaction zone. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to structurally form the jets and orifices in the apparatus of Uemura et al. to generate the recited

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pressure drop, since it has been held that changes in size involve only ordinary skill in the art, *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955), and it is conventionally known that high pressure drops are necessary for achieving good fluidization, as evidenced by Worley et al. In particular, Worley et al. teach, "it is important... for the fluidizing gases entering the bed to have a relatively high pressure drop in order to achieve good distribution to and fluidization of the bed," and a high velocity of fluidizing gas introduced through a distributor may be provided to generate the high pressure drop (column 1, lines 16-32). Also, the specific percentage of pressure drop is not considered to confer patentability to the claim since the precise percentage would have been considered a result effective variable by one having ordinary skill in the art.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (U.S. 4,308,806) in view of Richelsen (U.S. 2,946,668).

Uemura et al. are silent as to whether the reactor housing may comprise graphite. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select graphite for the reactor housing material in the apparatus of Uemura et al. on the basis of suitability for the intended use, since the use of graphite for reactor housing material is well known in the art, as evidenced by Richelsen. In particular, Richelsen teaches a high temperature reactor comprising carbon and graphite, which is highly resistant to corrosion since the material comprises more than 99.5% carbon (column 1, lines 46-67).

***Response to Arguments filed on June 24, 2003***

10. Applicant's amendments and arguments with respect to the rejection of claims 1, 2 and 13-15 under 35 USC 102(b) as being anticipated by Chen et al. have been fully considered and are persuasive, and thus said rejections have been withdrawn.

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11. Applicant's amendments and arguments filed with respect to the rejection of claims 1-3 and 18 under 35 USC 102(b) as being anticipated by Nishi et al. and the rejection of claims 4-10, 12-17, 19 and 20 under 35 USC 103(a) as being unpatentable over Nishi et al., and further in view of secondary references, have been fully considered and are persuasive, and thus said rejections have been withdrawn.

12. Applicant's arguments with respect to the rejection of claims 1-3, 7-9, 14, 15 and 18 under 35 USC 103(a) as being unpatentable over Uemura et al. have been fully considered but they are not persuasive.

Applicants assert (page 9, last paragraph to page 10, second paragraph),

"Uemura et al. provide air into the residue collection pipe 24 through the nozzles 27. The nozzles are not designed to refluidize the ash residue but to assure that the pipe remains unblocked."

However, the examiner respectfully disagrees and contends that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In the instant case, the *downwardly sloping* nozzles 27 as illustrated in FIG. 2 of Uemura et al. would inherently be capable of performing the intended use of re-fluidizing ash residue, as evidenced by a structure that is substantially the structure of the claimed "sparger chlorine gas orifices", which are structured such that, "the sparger gas is introduced at a *downwardly directed angle* to the central axis" (claim 8).

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Additionally, applicants assert,

“... there is no mention in Uemura et al. that the air disposed through the nozzle 16, the nozzles 27 and the pipe 19, are coordinated so the volume of gas emitted by each is a fixed predetermined ratio that maintains good mixing, minimizes defluidization of the reaction products, and promotes reaction of the reactant materials within the reaction zone.”

However, the examiner contends that limitations regarding the “volume of gas emitted” as well as the “predetermined ratio” do not patentably distinguish the claimed invention from the prior art, since the desired volume of emitted gas is not considered an element of the apparatus but a recitation of a process limitation based on the intended use of the apparatus.

13. Applicant's arguments with respect to claims 4-6, 10, 12, 13, 16, 17 and 19-21 have been considered but are moot in view of the new ground(s) of rejection as necessitated by amendment.

### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951.

The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung

August 26, 2003

JAL

Hien Tran

**HIEN TRAN  
PRIMARY EXAMINER**